AMATEUR SATELLITE REPORT

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AMSAT's® *Newsletter for the Amateur Radio Space Program*

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Rad-Hard Memory to Ruggedize Phase 3C Computer

AMSAT NA has received a significant donation of materials for the Phase 3C spacecraft. The Custom Integrated Circuit Division of the Harris Corporation of Melbourne, Florida has delivered on its promise of radiation-hardened memory circuits. The HS-6564RH parts donated to AMSAT NA for the next major satellite program are specifically designed to withstand the high radiation effects incurred in space flight. They will perform with an accumulated dose of greater than 100 kilorad (referenced to silicon). Besides being more than an order of magnitude more resistant to radiation damage compared to the NMOS memory flown on AO-10, use of the Harris parts will allow increasing memory capacity to 32k compared to the 16k flown on AO-10.

Gordon Hardman, KE3D, is spearheading the effort to rebuild the Integrated Housekeeping Unit (IHU) for Phase 3C using the new CMOS memories from Harris. Helping Gordon are Steve Robinson, W2FPY, Andy Deskur, KA1M and Ron Dunbar, WØPN.

The donation from Harris is valued at more than $80,000. The cost of the memories is very high because of the stringent tests to which they are subjected. The donation of the Harris parts resulted from contacts developed between AMSAT NA and Harris by Harold Winard, KB2M and Harris's Program Manager for Custom Integrated Circuits, Mr. Joel Alcorn.

Phase 3C Preparations Pace Quickens As Launch Approaches

A series of articles elucidating Phase 3C will appear in *QEX/SAT* magazine early next year. The articles aim to familiarize users and would-be users of the new satellite with what to expect when using the four transponders, Mode B, Mode JL, RUDAK and Mode S. If you would like to participate in authoring one or more of the historic articles introducing Phase 3C, contact WA2LQQ via AMSAT NA, P.O. Box 177, Warwick, NY 10990.

The Phase 3C launch campaign will kick off next year too. The precise kickoff day depends on the actual launch schedule. AMSAT will be flying on the European Space Agency's V21 mission, the first flight of the heavy-lift Ariane 4 rocket. Arianespace, the marketing arm, had planned to announce the 1987 launch schedule on November 13. It now tells AMSAT NA it will make the announcement in a few weeks, probably by the end of November.

Speculation has been that V21 will launch in August, 1987. However, as recently as three weeks ago, Arianespace Executive Vice President Douglas Heydon, WB6WDS, told AMSAT NA the V19 launch could take place as early as February, 1987, leading to a June 1987 launch for V21. Ariane launches have been grounded following the loss earlier this year of the V18 mission. A third stage malfunction downed the flight.

PAØDLO Receives VERON Kudos As "Amateur of the Year"

Nico Jansson, PAØDLO, has been named "Amateur of the Year" by the Dutch Amateur Radio Society, VERON. Nico was cited for his outstanding contribution to Amateur Radio through his superb efforts in support of the Amateur Satellite

Ed Means, WØVO, accepts Technical Achievement Award on behalf of the Colorado Phase 3C Integration Team.

Service over a protracted period. The award was made in Amsterdam 15 November according to SA AMSAT President Hans Van de Groenendahl, ZS6AKV, who attended the presentation. PAØDLO has been the linch-pin of AMSAT activities in Holland for nearly a decade and is a vital intermediary in information flow between AMSAT societies in Eastern Europe, Europe and the West.

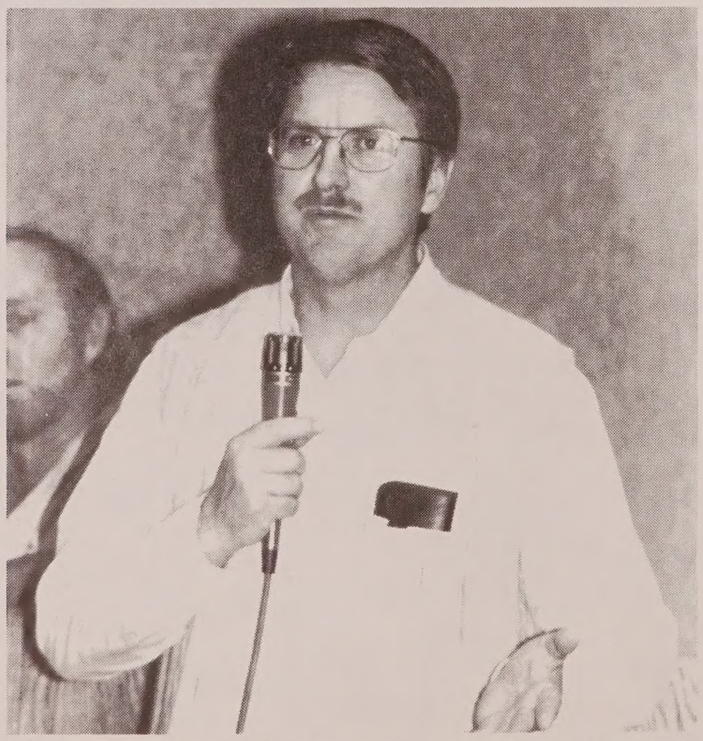
AMSAT NA adds its congratulations to that of VERON on PAØDLO's distinguished award and achievements!

Yearbook To Feature "Personal Reminiscences" Section

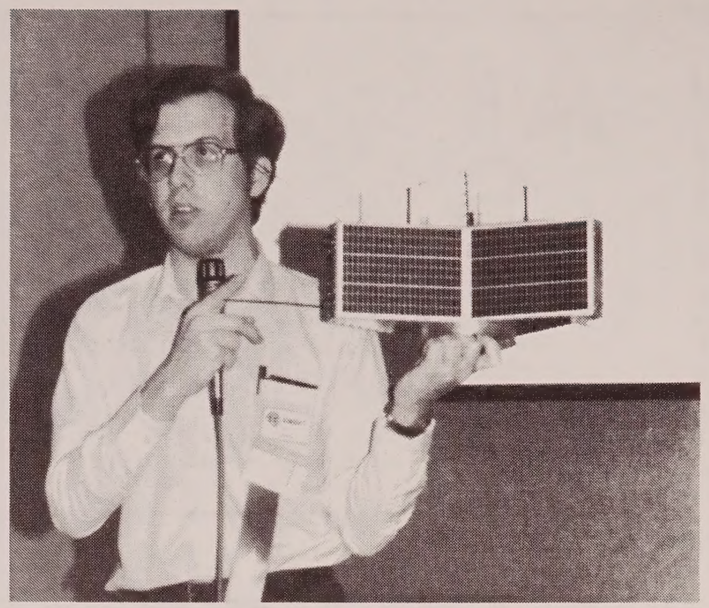
The AMSAT NA 25th Anniversary Yearbook project for which many photos and features have already been submitted will be adding a special new feature. In response to a number of suggestions from enthusiasts, a section featuring the personal reminiscences of OSCAR users will be included together with relevant photos depicting those memories where possible. The reminiscences can describe "first OSCAR QSOs", early experiences, most exciting OSCAR QSO, most historic OSCAR QSO and so forth. They should be described in brief in the author's own words. Photos may be included if they support the reminiscence addressed.

To have your "Fondest OSCAR Memory" included in the Yearbook, write down the recollection in clear English and in a brief, direct manner. Suggested length is 250 words or less. Unusually interesting and historically significant stories may exceed that guide at the discretion of the author. The editors will, however, exercise overall control of material submitted for publication. Mail submissions to : Yearbook, P.O. Box 177, Warwick, NY 10990. Include a SASE for return of materials or any inquiries.

Publication of the 25th Anniversary Yearbook is planned for first quarter, 1987.



Astronaut Dr. Tony England, WØORE spoke informally on various SAREX projects.



Phil Karn, KA9Q, gives a paper on satellite attitude determination by G3RUH.

AMSAT OSCAR 10 Returns to Limited Communications Service

Through the diligent work of a small team of satellite controllers and engineers, additional communications service is now being provided by AO-10. After exhaustive tests and diagnoses, the controllers have determined there is virtually no chance of working with the IHU memory. However, they have been able to switch on the transponder in a QRP mode which should insure the satellite's battery is not depleted immediately because of a negative net power budget. The QRP mode reduces transponder output power by 3 dB.

AO-10 has been in serious trouble since mid-summer when a rapidly deteriorating computer memory, damaged by three years exposure to the debilitating effects of ionizing radiation, no longer could support IHU operations. Although the error correcting mechanisms had in the past buffered the IHU from crashes due to memory faults, by last August the memory error content overwhelmed the correction mechanism's ability to cope. The memory has deteriorated exponentially since then.

In recent weeks controllers have attempted various strategies in order to fathom the problem and to find usable memory niches. It has become apparent in the last week that the situation on AO-10 is irreversible and hopeless. Nevertheless, it should be possible to evince additional service from AO-10 in the current QRP mode so long as sun-angles and resultant available spacecraft power allow.

AMSAT NA offers the following advice in brief: AO-10 IS available for limited Mode B use provided uplink power is reduced to very low levels. This means QSOs will be marginal at best. However, this is the best that can be expected under the circumstances. We should learn to both live with it and make the best of it. There is no operating schedule per se, that is, the transponder may remain on continuously. It may be used throughout its orbit for the present so long as the QRP uplink guidance is observed.

Annual Meeting/Space Symposium Prize Winners

Here is the list of prizes and the winners of those prizes as they were awarded in Dallas on November 8 at Annual Meeting Banquet.

Prize	Donor	Winner
ICOM IC-1271A Transceiver (Grand Prize)	ICOM America	Billy Overman, K4SNF
ALINCO ALM-203T 2m HT (Pre-registration prize)	Alinco Electronics	Scott Kendall, WA5LHM
Eimac 3CX100A5 tubes, pair (Pre-registration prize)	Eimac Varian	Wayne Lewis, KF5JR
Cushcraft 416TB 70cm antenna	Cushcraft Corp	Kevin, VE7CPT
Yaesu FT-727R 2m/70cm HT	Yaesu USA, Inc	Ken Knudson, W5PLN
Lunar PAG 432 GaAsFET preamp	Lunar, Inc.	Max, XE1XA
KLM 1.2-44LBX 1.3 GHz Yagi	Mirage/KLM	Cleyon Yowell, AD6P
AEA AMT-1 AMTOR-RTTY unit	Adv. Elect. Applic.	Lou McFadin, W5DID
23-45LY 1.3GHz loop Yagi	Downeast Microwave	Bob Whitehurst, W4KDP
THP HRA-2 2 m mm GaAsFET	Encomm, Inc	Jim Jones, K5PER
Free Room at Hilton	D/FW Airport Hilton	Gar Anderson, KØGA
Satellite dish, ten foot	Continental Sat.	Steve Bienvenu, NB5F
100' Belden 9913 w/conect.	ECI, Dallas	Courtney Duncan, N5BF
Welz SP-15M SWR/pwr meter	ECI, Dallas	Martin Sweeting, G3YJO
Daiwa NS-663a SWR/pwr meter	Hardin Electronics	Bill, WB6BTA
$50 gift certificate	Nortex Electronics	Tony England, WØORE
Tonna F9FT 1.3GHz X-yagi	PX Shack	Al Brinckerhoff, WB5PMR
Landwehr 2m mm GaAsFET	Henry Radio	Paul Grice, N5GIT
ARR SP432VDG GaAsFET preamp	Adv Rcvr Research	Hennie Rheeder, ZS6ALN
GRAFTRAK-II/Silicon Ephemeris (2 sets)	Silicon Solutions	John Henry, VE2VQ Stewart, N1DML

Short Bursts

• More details from the Annual Meeting. AMSAT SA President Hans van de Groenendahl, ZS6AKV, presented SA AMSAT awards to Tom Clark, W3IWI, Dick Daniels, W4PUJ, Karl Meinzer, DJ4ZC and Vern Riportella, WA2LQQ. The awards for for outstanding achievements in the Amateur Satellite Service.

• Operations from an ice station located at 82 degrees North, 167 degrees East are possible according to PAØDLO and G3IOR. Watch for 4KØD on RS-5 and RS-7.

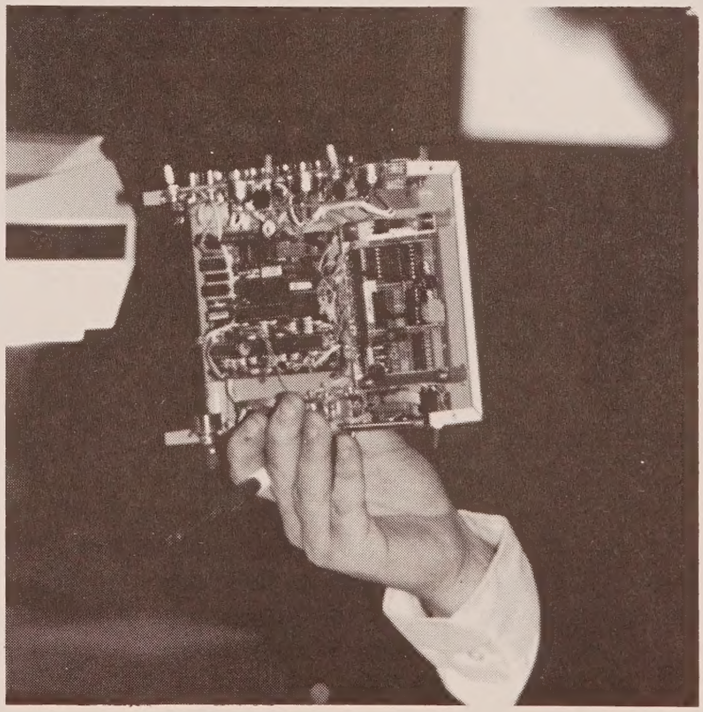
• RS-5 and RS-7 emerge from the current eclipse cycles in early December.

• The very rare UJ9 has shown up on the RS birds. Watch for UJ9JWA.

Seek New Radio Sport Activity On Phase 3C

With the launch campaign for Phase 3C beginning next year, planners will be dusting off and updating several programs put on the shelf with the demise of AO-10. The ZRO Test, Project Linkup and Project Gateway will be back. But in the offing is a brand-new concept embodying the spirit of "Radio Sport".

Combining the best of technology and traditional Amateur Radio fun, a new project will borrow a page from the SARSAT/COSPAS rescue satellite book. AMSAT NA is working to develop a "Fox and Hound" radio-location technique and competition for use on Phase 3C. There are a number of significant technical issues to be worked out but in theory it should be possible to locate a hidden "fox" to within a small region in an hour or less using relatively simple equipment, a cooperative "fox" and Phase 3C. Details soon.



The TAPR FO-12/PSK modem prototype as shown by W3IWI.

Why Not Try 432 MHz?

by Ray Soifer, W2RS

While many of us are waiting for the next Mode B satellite or hoping for a "second coming" of AO-10, some perfectly serviceable 70 cm transmitting equipment is gathering dust in what may be thousands of North American ham shacks. At least in between passes of FO-12, why not take that station and put it on 432?

It seems to this "old timer" that the activity situation today on 432 MHz SSB and CW is very similar to that of 144 MHz a decade or so ago: thousands of multimode transceivers and transverters purchased primarily for satellite use are in place but are hardly ever heard on the air except during satellite passes. Yet that same equipment is capable of providing many hours of operating enjoyment (as well as surprising DX) in "terrestrial" service if only enough stations would get on to create a "critical mass" of activity.

Propagation at 432 MHz is similar in many ways to that at 144 MHz. A typical satellite station with 1 kW EIRP would be capable of two-way SSB and CW communication over distances of up to 300 km or more under normal conditions and over average terrain. While sporadic-E is unknown at 70 cm and meteor scatter and aurora are very rare, tropospheric refraction and ducting effects are even more pronounced there than at 2m. Contacts of over 1,500 km during "tropo" openings are commonplace. For those suitably located, transequatorial propagation has also been reported. Unlike 144 MHz, man-made noise and RF interference from cable TV and personal computers are virtually nonexistent at 70 cm although your noise blanker may get a real workout at times from radar!

Most North American stations use 432.100 MHz as a calling frequency moving off once contact has been established. What "terrestrial" activity there is tends to concentrate within 30 kHz or so of the calling channel. The range from 432.000 to 432.050 MHz is generally reserved for EME work. Antenna polarization is horizontal although a circularly polarized satellite antenna will work with a loss of no more than 3 dB (and usually less due to rotation effects). The ARRL offers a 70 cm VUCC certificate for confirmed contacts with 50 or more grid squares. Several weekend contests each year highlight the 432 MHz calendar. Once you get into it, you will probably want to upgrade your station. But even an unmodified satellite setup should be enough to earn VUCC under favorable conditions.

So point that antenna toward the horizon some evening (try a Monday local time... it's the 432 MHz "activity night") and discover a new kind of operating fun. If you don't hear anyone, "make some noise" on 432.100 and keep it up in different antenna directions until a QSO results. Then do it again; if everyone listens and no one transmits, how will we know who is out there? I am convinced many more band openings actually occur than we now realize for lack of sufficient activity. The same effect was noted at 2 m in the 1970's and reports from Europe (where 70 cm activity has always been much greater than in North America) are full of real DX.

See you on 432! Those of us already there are waiting upon your arrival!

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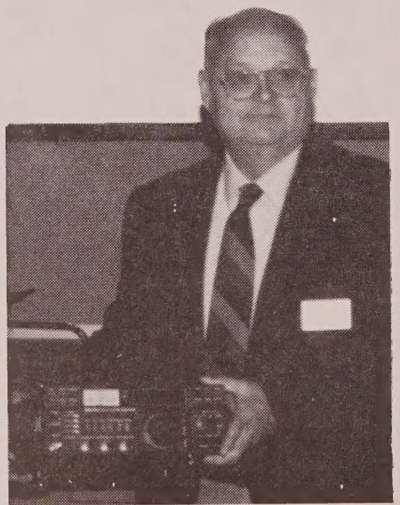

Billy Overman, K4SNF, won the Grand Prize ICOM IC-1271A.

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